TRANSLATION OF THE INTERNATIONAL PATENT APPLICATION AS PUBLISHED

URINAL

The invention relates to a urinal comprising a dish, which forms a urinal basin with a drain passage in its bottom, and a syphon trap connected to the drain passage.

In conventional urinals, the dish of which is typically configured for being mounted to a wall, the syphon trap is arranged directly below the urinal basin, so that it is difficult to get access to the same during mounting and maintenance works.

For minimizing the consumption of fresh water, waterless urinals are increasingly employed in place of water-flushed urinals, same embodiments of the waterless urinals comprising a trap liquid that has a smaller specific weight than water and remains in the syphon trap. These waterless syphon traps must however be exchanged or at least serviced from time to time, for example by exchanging the trap liquid, or evaporation losses must be replaced. Since, consequently, the syphon trap should be readily accessible, it has heretofore been arranged directly in the bottom of the urinal basin in a countersunk fashion. This, however, has the drawback that the cover of the syphon trap, which is typically made of plastics, is visible in the urinal basin and forms a joint with the ceramics of the urinal basin, which joint is ugly and difficult to clean.

It is therefore an object of the invention to provide a urinal wherein the syphon trap is arranged to be hidden and nevertheless easy to maintain.

According to the invention, this object is achieved by that the dish forms an essentially vertical wall which separates the urinal basin from a chamber arranged behind the same, and by that the syphon trap is arranged in this chamber to be accessible from above.

In the urinal according to the invention, the drain passage passes from the bottom of the urinal basin slantingly through the vertical wall into the cham-

ber which accommodates the syphon trap. Thus, the syphon trap is hidden behind the vertical wall. Nevertheless, the syphon trap can readily be accessed during maintenance works. In order to get access to the syphon trap, it is only necessary to remove a top cover of the chamber arranged behind the urinal basin, so that the syphon trap can be accessed from above. Thus, in case of a waterless syphon trap, the syphon trap may itself have a conventional construction and may be withdrawn upwardly by means of a key that is engaged in the cover in bayonet fashion.

Useful embodiments and further developments of the invention are indicated in the dependent claims.

The vertical wall, which separates the urinal basin from the chamber accommodating the syphon trap, preferably has an approximately half-cylindrical shape, so that it bulges convexly into the urinal basin. The chamber, which may be either open or closed at the rear side facing the building wall, thus has the shape of a vertical, approximately half-cylindrical wall and is preferably closed by a detachable lid at both, its top end and its bottom end, which facilitates not only the access to the syphon trap but also the process of mounting the urinal basin to the wall. The convexly curved shape of the vertical wall has the further advantage that the urine jet impinging on the wall will better be diffused, and back-splashing of urine is minimized. Moreover, it is possible thanks to this shape of the vertical wall to achieve a design of the dish, as a hole, which has essentially no undercuts, so that the dish can also be molded from plastic materials and can readily be removed from the mold.

In waterless urinals, the invention has the further advantage that a forced ventilation valve may be arranged on the syphon trap and will then be hidden behind the vertical wall, so that it will not be visible when the urinal is used and will not come into contact with urine, neither. The forced ventilation of the syphon trap avoids an essential drawback of conventional waterless urinals, which consists therein that a negative pressure in the piping system will cause the trap liquid to be sucked-off. Thus, the forced ventilation also reduces the consumption of trap liquid, and the trap liquid needs only to be checked and/or replaced in larger intervals.

A scent agent may be added to the trap liquid in the syphon trap, so that conventional scent stones in the urinal basin may be dispensed with. Since the chamber accommodating the syphon trap is closed at the top, the scent agent can essentially escape only through the drain passage or passages in the bottom of the urinal basin, so that the discharge of the scent agent can be controlled and dosed in a desirable way.

At the same time, the arrangement of the syphon trap in the largely closed chamber will also minimize the evaporation losses of trap liquid and the possible generation of bad odours.

According to another advantageous embodiment of the invention, a larger storage tank and an automatic dosing system for trap liquid and/or scent agent may be arranged to be hidden in the chamber behind the urinal basin. The automatic dosage of the liquid will further prolong the maintenance intervals.

An embodiment example of the invention will now be described in conjunction with the drawing, wherein:

Fig. 1 is a front view of the urinal;

Fig. 2 is a side elevation of the urinal;

Fig. 3 shows a top view of the urinal shown in figures 1 and 2;

Fig. 4 is a vertical section through the urinal mounted to a building wall;

Fig. 5 is an enlarged section through a syphon trap of the urinal;

Fig. 6 shows a top view of the syphon trap shown in figure 5; and

Fig. 7 shows a vertical section through the urinal, analogous to Fig. 4, in a condition in which a cover of the syphon trap is removed.

The urinal shown in Figs. 1 to 4 comprises a dish 10, which is adapted to be mounted to a wall and is preferably formed in one piece from plastics by injection molding. The dish 10 forms a vertical, convexly curved wall 12 and a urinal basin 14 projecting from the convex front side of the wall 12. The wall 12, together with a building wall 16 (Fig. 4) to which the urinal 10 is mounted, forms an approximately half-cylindrical chamber 18 which is bevelled at the top and bottom ends in such a manner that it tapers towards the front, and which accommodates a waterless syphon trap 20. The top and bottom openings of the chamber 18 are closed by detachable lids 22, 24. As is shown in Fig. 3, the bottom of the urinal basin 14 is formed with several small drain passages 26 which pass slightly slantingly through the wall 12 and open-out directly above the syphon trap 20. Fig. 4 further shows a drain pipe 28 disposed in the building wall 16 and connected to the syphon trap 20. In the example shown, the syphon trap is detachably suspended in an intermediate floor 30 that is horizontally arranged in the chamber 18 and integrally connected to the wall 12. A pot 30a, which accommodates the syphon trap 20 is formed integrally with the intermediate floor 30. A rear wall 31 projects from the intermediate floor 30 and extends to a higher level than the "mouth" of the urinal basin and, together with the intermediate floor 30 and the curved wall 12, forms a closed tub. If the drain pipe 28 is blocked, the urine will thus not flow down along the building wall 16 within the chamber 18, but will flood forwardly from the urinal basin.

In Fig. 5, the syphon trap 20 inserted into the pot 30a has been shown in an enlarged section. The pot 30a forms a connector 30b for the drain pipe 28. The syphon trap 20 is composed of three plastic members that are connected to one another by ultrasonic welding, namely: a pot-shaped flood vessel 32, a cylindrical insert 34 inserted into the flood vessel 32, and a cover 36 placed on top of the flood vessel 32 and having the shape of a flat funnel. A flood tube 38 projecting from the bottom of the flood vessel 32 has its open lower end aligned with the connector 30b. The insert 34 has a separating wall 40 which extends vertically in the top portion and slightly inclined in the lower portion and ends with its lower edge in a distance above the bottom of the flood vessel 32 and passes diametrically through the cylindrical insert 34. The cover 36 is fitted in the top opening of the flood vessel 32 with a peripheral collar and seals the flood vessel liquid-tightly. Further, the cover 30 is liquid-tightly engaged with the top portion of the separating wall 40 through

two parallel flanges 42. The flood vessel 32 has a peripheral flange near its top edge and is suspended in the intermediate floor 30 in such a manner that the funnel-shaped cover 36 is flush with the top side of the intermediate floor 30. At its lowest position, the cover 36 has a central bore 44 which is surrounded by three perforations 46 that are arranged with uniform angular spacings and of which only one is visible in Fig. 5 (compare Fig. 6).

The drain passage 26 of the urinal basin 14 opens directly above the top side of the cover 36. The cover forms a limiting wall 48 which is U-shaped in plan view and encompasses the performations 46 and is sealingly adjoined to the vertical wall 12 of the dish 10 with its parallel legs. Outside of the limiting wall 48, the cover 36 is formed with a plug connector 50 for a forced ventilation valve 51. The valve 51 is mounted on a detachable floor 52 that rests on the limiting wall 48.

The urine flows through the drain passage 26 over the cover 36 and through the perforations 46 thereof into the flood vessel 32 and fills the same up to the height of the flood tube 38. The separating wall 40 separates the flood tube 38 from a trap volume that contains a trap liquid F that has a lower specific weight than urine. The meniscus between the trap liquid F and the urine is indicated in Fig. 5 by a chain line and is (because of the weight of the trap liquid) slightly lower than the top end of the flood tube 38 and the level of urine therein. Urine that is freshly supplied via the preforations 46 sinks downwardly through the trap liquid, so that, according to the principle of communicating tubes, the level of the urine in vicinity of the flood tube 38 will also be increased and the urine will flood into the flood tube 38 and then be drained through the drain pipe 28.

If, for any reason, a low pressure occurs in the drain pipe 28, the forced ventilation valve 51 will open, and the space of the flood vessel above the flood tube 38 will be ventilated. This prevents urine and trap liquid from being sucked out of the flood vessel.

Small amounts of trap liquid may evaporate through the perforations 46. However, this evaporation will essentially be stopped when the chamber 18 above the syphon trap 20 is saturated with vapour of the trap liquid. Only

very small amounts of trap liquid, to which a scent agent is preferably added, may evaporate through the drain passage 26.

In the shown embodiment, in order to replace even the small evaporation losses of trap liquid, a storage tank 54 for trap liquid and/or a liquid scent agent is suspended in the chamber 18, and the liquid from this storage tank will gradually be dripped onto the cover 36 via a tube 56 and a metering valve 58.

When the cover 36 is sealed at the intermediate floor 30, it may also be admitted that, when the metering valve 58 is opened too far, the level 60 of the trap liquid raises beyond the cover 36, as is indicated in chain lines in Fig. 5. In this case, however, the evaporation rate will decrease, so that the level of the liquid will be stabilized. This has also the desirable effect that a larger amount of scent agent will enter into the urinal basin 14 through the drain passage 26. In this case, the limiting wall 48 will prevent the trap liquid from flowing off over the intermediate floor 30.

Figure 6 shows the limiting wall 48 and the preforations 46 in plan view.

When the syphon trap is to be exchanged, the top lid 22 of the chamber 18 and the floor 52 are removed, so that the syphon trap 20 will be accessible. Then, in a known manner, a key 62 (Fig. 7) that is suitably adapted to the shape of the preforations 46 is inserted into the perforations 46 from above and, by being rotated slightly, is locked in bayonet fashion, so that the cover 36 and, with it, the whole syphon trap can be withdrawn upwardly from the pot 30a. In an alternative embodiment, only the cover 36 of the syphon trap may be removable.

Fig. 7 illustrates how the syphon trap 20 is withdrawn upwardly by means of the above-mentioned key 62. In the example shown, the key 62 has a joint 64 and a lever 66 at its top end. When, due to contaminants, the syphon trap has become locked in the opening of the intermediate floor 30 and is therefore difficult to detach, the lever 66 may be supported on the top edge of the vertical wall 12 of the dish 10, so that the syphon trap may be lifted with leverage-increased force.